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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,455	10/01/2003	Khoi Phan	H0280 / AMDP818US	7559

23623 7590 03/04/2005

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EXAMINER

WALLING, MEAGAN S

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,455

Applicant(s)

PHAN ET AL.

Examiner

Meagan S. Walling

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 4-6, 8, 9, 11, 14, 15, 18, 21, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Pinto et al. (US 6,566,885).

Regarding claim 1, Pinto et al. teaches a scanning component that detects and images soft defects (column 2, lines 36-37 and 41-42); a milling component that excises material at soft defect locations (column 3, lines 8-10); and an analysis component that determines whether a signature is present in the chemical composition of a soft defect (column 3, lines 8-10).

Regarding claim 4, Pinto et al. teaches that the scanning component comprises at least one of a scanning electron microscope and a focused ion beam (column 4, lines 38-40).

Regarding claim 5, Pinto et al. teaches that the milling component comprises a focused ion beam (column 3, lines 8-10).

Regarding claim 6, Pinto et al. teaches that the focused ion beam comprises at least one of a single-beam focused ion beam and a dual-beam focused ion beam (column 27, lines 12-14).

Art Unit: 2863

Regarding claim 8, Pinto et al. teaches a processor operatively coupled to the scanning, milling, and analysis components for sending and receiving information to and from the components (Ref. 56); and a memory operatively coupled to the processor for storing information received and sent by the processor (Ref. 52).

Regarding claim 9, Pinto et al. teaches that the memory comprises at least one of volatile and non-volatile memory (Ref. 52).

Regarding claim 11, Pinto et al. teaches scanning and imaging soft defects (column 2, lines 36-37 and 41-42); milling detected soft defects to remove contaminants (column 3, lines 8-10); and analyzing detected soft defects to determine whether a signature is present in the chemical composition of the soft defects (column 3, lines 8-10).

Regarding claim 14, Pinto et al. teaches that the soft defect is scanned and imaged via employing at least one of a scanning electron microscope and a focused ion beam (column 4, lines 38-40).

Regarding claim 15, Pinto et al. teaches that the soft defect is milled via employing a focused ion beam (column 3, lines 8-10).

Regarding claim 18, Pinto et al. teaches making a determination as to whether a detected signature is detrimental to reticle performance (column 12, lines 59-64).

Regarding claim 21, Pinto et al. teaches means for scanning and imaging a soft defect (column 2, lines 36-37 and 41-42); means for milling the soft defect (column 3, lines 8-10); and means for analyzing the soft defect to determine whether a signature is present in the chemical composition of the soft defect (column 3, lines 8-10).

Regarding claim 23, Pinto et al. teaches means for processing information related to the detection and analysis of a soft defect (Ref. 56); and means for storing information related to detection and analysis of a soft defect (Ref. 52).

2. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Celler et al. (US 5,482,802).

Regarding claim 20, Celler et al. teaches employing a focused ion beam in a non-reactive gas environment (column 2, lines 40-41); effecting a phase shift in the signature to a gaseous state (column 2, lines 42-44); and providing a continuous pump-out of the non-reactive gas environment to remove a signature in gaseous form (column 2, lines 43-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto et al. in view of Natsubori et al. (US 5,105,092).

Art Unit: 2863

Pinto et al. teaches all of the limitations of claims 2 and 12 except the limitations that the reticle comprises a pellicle (current claim 2) and the reticle is scanned in a non-pellicle region (current claim 12).

Natsubori et al. teaches a reticle (Ref. 9) with a pellicle (Ref. 10) wherein the non-pellicle region is scanned (column 4, lines 13-14).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Pinto et al. with the teachings of Natsubori et al. to scan the non-pellicle region of the reticle. The motivation for making this combination would be to determine if there are defects on any portion of the reticle, not merely in the pellicle region.

4. Claims 3, 13, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto et al. in view of Lu et al. (US 6,383,715).

Pinto et al. teaches all of the limitations of claims 3, 13, and 22 except the limitation that the signature is indicative of the presence of at least one of sulfur, phosphorus, and an amino group.

Lu et al. teaches the presence of sulfur in blob defects (column 3, lines 35-37).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Pinto et al. with the teachings of Lu et al. to search for sulfur, phosphorus, or amino groups in the defects. The motivation for making this combination would be locate signatures indicative of elements and compounds that could be detrimental to the reticle.

Art Unit: 2863

5. Claims 7, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto et al. in view of Tracy et al. (US 5,847,821).

Pinto et al. teaches all of the limitations of claims 7, 16, and 17 except the limitation that the analysis component comprises at least one of an electron microscope for chemical analysis and a Fourier transform infrared spectroscopy (current claim 7), that the soft defect is analyzed via electron spectroscopy for chemically analysis if the soft defect is smaller than a predetermined size (current claim 16) and that the soft defect is analyzed via Fourier transform infrared spectroscopy if the soft defect is larger than a predetermined size (current claim 17).

Regarding claims 7 and 17, Tracy et al. teaches using a FTIR to analyze a defect (column 8, lines 1-3).

Regarding claim 16, Tracy et al. teaches performing a chemical analysis via electron spectroscopy (column 7, lines 64-67).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Pinto et al. with the teachings of Tracy et al. to use a FTIR or electron spectroscopy to analyze a defect. The motivation for making this combination would be to identify compounds on the surface of the device (Tracy et al., column 8, lines 1-3) or to perform chemical defect analysis (column 7, lines 64-67).

6. Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto et al. in view of Chiou (US 6,704,691).

Pinto et al. teaches all of the limitations of claims 10 and 19 except the limitation of predicting soft defect growth with respect to time.

Art Unit: 2863

Chiou teaches predicting the future defect count on a wafer (column 5, lines 37-39).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Pinto et al. with the teachings of Chiou to predict future defect growth. The motivation for making this combination would be to know when it was necessary to remove the defects before they become detrimental.

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto et al. in view of Celler et al.

Pinto et al. teaches all of the limitations of claim 24 except the limitation of converting a signature to gaseous form for removal from the reticle.

Celler et al. teaches converting defects to gases for removal (column 2, lines 40-44).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Pinto et al. with the teachings of Celler et al. to convert the signatures to gaseous form for removal. The motivation for making this combination would be to remove the defects without removing non-defective material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meagan S. Walling whose telephone number is (571) 272-2283. The examiner can normally be reached on Monday through Friday 8:30 AM to 5 PM.

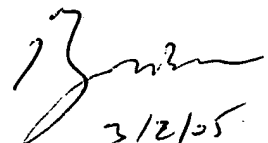
Art Unit: 2863

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

msw

BRYAN BUI
PRIMARY EXAMINER



3/2/05